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United States Department of Agriculture,

BUREAU OF PLANT INDUSTRY,

Forage Crop Investigations,

WASHINGTON, D. C.

GRAIN SORGHUMS.

The following varieties of sorghum have come to be quite generally designated as "grain sorghums" in preference to the earlier class name of "nonsaccharine sorghums." Like all class names, which are descriptive, both names for this group are more or less misleading. Kafir, the most widely grown variety of this group, has considerable sugar in the stem, and all of the varieties are valuable as forage and are used extensively as a source of roughage both in the form of fodder and as silage.

The yield of forage from the grain sorghums is usually about two-thirds that of the sweet sorghums, but the smaller yield is partly balanced by the higher feeding value of the seed of grain sorghums, which is an important item in both fodder and silage. Yields of 20 to 40 bushels of grain or 3 to 4 tons of fodder may be expected from the better varieties.

VARIETIES.

Blackhull kafir.—This is often called "Standard" kafir and is the most widely grown variety of the grain sorghums. It grows to a height of 5 to 7 feet, varying with soil and climatic conditions. The stem is thick, erect, medium juicy, and slightly sweet, bearing numerous broad dark-green leaves which maintain their succulence until the seed is nearly ripe. The seed is rather small, nearly white, and partially inclosed by shining black hulls. The head or panicle is cylindrical in shape, rather compact, and usually well exerted from the sheath. Blackhull kafir requires 115 to 130 days for its maturity and is best adapted to the eastern two-thirds of Kansas, Oklahoma, and Texas. It is also grown successfully under irrigation in Colorado, New Mexico, Arizona, and California.

Dwarf kafir.—This variety originated as a selection from the Blackhull kafir described above and is similar to it in all respects except that it is not so tall and is about two weeks earlier in maturity. It grows to a height of $3\frac{1}{2}$ to $4\frac{1}{2}$ feet and matures in 105 to 115 days. This shorter season of growth makes it a successful crop under the more trying conditions in the western part of Kansas, Oklahoma, and throughout the Texas Panhandle, where it is to be recommended over Blackhull kafir.

White kafir.—This variety is quite similar to the Blackhull kafir, except that it has white or greenish colored hulls instead of black and has the rather serious disadvantage of failing in many cases to completely exert the head from the sheath. This causes decay and imperfect development of the lower part of the head. White kafir is not grown commercially.

Red kafir.—Very similar to Blackhull kafir, except that the seeds are light red and the head is longer and more slender. The seed hulls are usually black, but in some strains are light red. Its growing season is about the same as that of Blackhull kafir, but it ordinarily yields less and is being replaced on most farms by the latter variety.

Pink kafir.—Several strains of kafir having light red or pink seeds and pink or straw-colored glumes are being grown under this varietal name. The earlier strain was a direct importation from Africa and differed from Blackhull kafir not only in the color of the seed and hull, but also in the length of the growing season and size of the plant. It was fully a week later than Blackhull and about 1 foot taller. The head or panicle was also larger and not so compact. This strain made good yields of both grain and forage at the Chilocoth (Tex.) Field Station, but is not being grown commercially.

Another strain of Pink kafir was developed later in Kansas and has attained some prominence as a commercial crop in north-central Kansas and even on the poor soils farther east in that State. It is from 10 to 20 days earlier than Blackhull kafir and has more slender stems and heads. There is not much chance that it will replace Blackhull and Dwarf kafir over much of the sorghum area.

Dwarf hegari.—This variety originated as a selection from an importation of sorghum seed from the Sudan region of Africa in 1908. It resembles Dwarf kafir very much, but the stems are more juicy and sweeter and the seeds larger, being about intermediate in size between the seeds of kafir and feterita. Dwarf hegari under ordinary conditions grows to a height of 4 to 5 feet and matures in 100 to 115 days, but is quite variable in this respect. It is adapted to north-central Texas and the irrigated valleys of New Mexico and Arizona.

Yellow milo.—This variety is characterized by slender pithy stems; by few leaves, which wither and dry up as the plant ripens; by its compact egg-shaped heads, which are often "goosenecked"; and by its large roundish, rather flattened, yellowish red seeds. The so-called "Standard" milos grow to a height of 5 to 7 feet and mature in 110 to 120 days. These tall strains are not very widely grown now, having been replaced very largely by the Dwarf milo.

Dwarf milo.—This variety differs from the "Standard" or tall milo described above in its shorter growing season, greater leafiness, and dwarf stature. Commercial strains of Dwarf milo range from $3\frac{1}{2}$ to $4\frac{1}{2}$ feet in height, depending on the conditions under which they are grown. A strain developed by the United States Department of Agriculture in the Texas Panhandle is more uniform and usually grows to a height of 3 to $3\frac{1}{2}$ feet. Dwarf milo matures in 90 to 100 days and is the most productive and surest grain crop in regions of extreme drought. It is now the leading variety of grain sorghum in western Oklahoma, western Texas, and eastern New Mexico. It is also an important crop in the irrigated valleys of New Mexico and Arizona and in the interior valleys of southern California. The greatest weakness of Dwarf milo is the preference which the chinch bug shows for this variety.

White milo.—This variety differs but little from the Yellow milo, except that the seeds are white instead of yellowish red. White milo

has not yet become an important commercial crop, but it appears to have the same ability to produce a crop under adverse conditions as the Yellow milo. It is adapted to the same regions as Dwarf milo.

Feterita.—This is an early-maturing sorghum which was obtained from the Sudan region of Africa. It grows to a height of 5 to 7 feet, with rather slender semijuicy and slightly sweet stems. The heads resemble the milo in shape but are longer. The seeds are large, white, and rather soft. The seed hulls are ordinarily black but sometimes gray or straw colored. *Feterita* ordinarily ripens in about the same time as Dwarf milo, 90 to 100 days, and is equally drought resistant. Its weak points are its tendency to branch and lodge when not harvested as soon as it is ripe and the ease with which the grain shatters from the head. In average years it yields somewhat less than Dwarf milo, but in especially dry years it serves as an insurance against complete failure.

Kaoliang.—This group of sorghums shows great diversity and is represented by numerous varieties, most of which have been imported from northern China and Manchuria, where it has long been the principal grain crop. Some varieties are very tall and others quite dwarf, while nearly every color known in sorghums is represented in the seeds and hulls. Both early and late varieties are available, but *kaoliang* does not promise to become important in the United States. It is best adapted to the northern Great Plains in North Dakota, South Dakota, and eastern Montana.

Durra.—A large number of varieties of sorghum belong to this group and it was one of the first sorghums to be imported and tested in the United States, but never developed into a commercial crop. White *durra* was for a time grown under the name of "Jerusalem corn," and both this and the Brown *durra* are still grown to a small extent in the interior valleys of California, but hardly anywhere else. The group shows almost as great diversity as the *kaoliangs*.

Shallu.—This group of sorghums has been grown in the United States under various names, the most common of which are "Egyptian wheat" and "California rice-corn." It is characterized by tall, pithy stems and a loose, drooping head or panicle. It produces fairly abundant crops of grain, but the seed shatters freely when ripe and tests prove that other varieties, such as *kafir* and *milo*, will usually outyield it. *Shallu* is grown more extensively in California than in any other part of the United States.

PLANTING.

The grain sorghums should be planted about two or three weeks later than Indian corn except in regions troubled with the sorghum midge, where very early plantings are recommended. The method of planting varies with the locality and climatic conditions. Sorghum can be surface planted or listed, but in dry regions it is more commonly planted in listed furrows, as this method places the roots deep in the soil and aids the plant to withstand drought. Ordinarily the grain sorghums are planted in cultivated rows 36 to 44 inches apart, or about the same as Indian corn. When planting in this manner 3 to 4 pounds of clean seed will be sufficient for an acre if intended as a grain crop and 4 to 5 pounds if it is being grown primarily for forage. With well-prepared ground and seed of good germination the lower rate of seeding is advised. Thick stands produce finer

stalks and smaller heads, but will be liable to greater injury from drought than the comparatively thin stands.

CULTIVATION.

Sorghum should be cultivated much the same as Indian corn. It is usually best to cultivate two or three times with a harrow while the plants are small, but as soon as sufficient growth is made the crop should be given a fairly deep and thorough cultivation. Two or three subsequent and shallower cultivations are desirable to destroy weeds. Care should be used to have these later cultivations shallow, in order to avoid breaking the feeding roots.

HARVESTING.

If harvested for both grain and fodder, the crop should be cut in the late dough stage. Cutting with a corn binder and shocking in the field is the least expensive method. A corn binder is also the most practical method of harvesting if the crop is to be utilized as silage. When grown solely for the grain yield, it should be allowed to stand until the stems at the base of the head are dry. If the heads are cut by hand from the standing stalks, the remainder of the crop can be utilized for pasture.

FEEDING.

The grain sorghums are valuable as a grain crop and provide the feeder in the arid regions with a very satisfactory substitute for corn. When used as a grain feed it is well to grind the seed, or its full value as a grain will not be realized. Where fed to cattle in the bundle, hogs should always be kept in the feed lot to pick up the undigested and scattered grains. It has been found in practical feeding tests that it takes about 10 pounds of sorghum grain to equal 9 pounds of corn. These sorghums make good silage, but the tonnage is usually not so large as that of the sweet sorghums. Much of the sorghum is fed in the bundle to both horses and cattle, providing thus both grain and roughage. A little cottonseed meal or some other concentrate rich in protein and fat should be fed with it.

SEED SELECTION.

With a few exceptions, home-grown seed is always best. It is therefore essential that each farmer select and keep his own seed from year to year. The best time to make selections is in the field as soon as the earlier heads mature. Leafy plants without side branches and with little tendency to stool should be selected. A uniform head, well shaped and well filled at both butt and tip, should be selected. In seed selection, care should be taken to avoid hybrids. The exceedingly large heads are generally the result of hybridization or of some local variation in stand or soil conditions. Selections should be made 100 yards or more from any other variety of sorghum, as all varieties cross freely. By careful selection and the growing of your own seed, yields can be materially increased.

H. N. VINALL,
Agronomist.

JANUARY 4, 1919.